

REMARKS

Claims 45-81 are pending in this application. By this Amendment and Response, claims 47, 49-51, 53-55, 57 and 80 have been amended; claims 46, 48, 52, and 68-74 have been cancelled; and new claims 82-92 have been presented. It is believed that all claims as now presented overcome the rejections of record and present patentable subject matter for which allowance is respectfully requested.

Claim Amendments

By the foregoing amendment, Applicant has cancelled those independent claims drawn to the combination of the LED panel and the diffuser panel, namely claims 45 and 68, and left for purposes of prosecution those independent claims drawn to the preferred embodiment pertaining to the illumination apparatus comprising the combination of the LED panel, the Fresnel lens panel and the diffuser panel, namely claims 58 and 75. The claims dependent upon the cancelled independent claims have either been cancelled, or in the case of claims 47, 49-51, 53-55, and 57 amended to change the dependency to the remaining independent claims. No new matter is entered.

Claim 80 has been amended to add the phrase “other than a television” so as to distinguish between those displays that are part of a television and those that are not. The latter displays are well known in the art and include, e.g., digital signage, advertising panels, and the like. This language is supported throughout the specification as Applicant repeatedly refers to “televisions and other displays” (See, e.g., Paragraph [0002]). No new matter is entered.

New claims 82, 83 and 87, 88 make clear that the Fresnel lens panel comprises a plurality of Fresnel lenses and that the plurality of Fresnel lenses are in an array configuration. Support for these claims is present in Paragraphs [0015] and [0016] as well as Figure 1. No new matter is entered.

New claims 84-86 and 89-91 pertain to the thicknesses of the apparatus as well as the components thereof, support for these claims is found at Paragraph [0018]. Again, no new matter is entered.

Finally, new claim 92, which ultimately depends from claim 58, is the corresponding claim to claim 80, as mentioned above, which depends from claim 75. No new matter is entered.

REMARKS

Anticipation

Claims 45-50, 55, 68-71 and 73 stand rejected under 35 USC §102(b) as being anticipated by Johnson et. al. (US 6,439,731)

This rejection is moot in light of the cancellation of independent claims 47 and 68 and the cancellation or amendment to their former dependent claims. Applicant neither admits nor denies the allegations set forth in the rejection and reserves the right to file a continuation application to the subject matter of the cancelled claims.

Obviousness

Johnson et. al. in view of Shimada et. al.

Claims 51-54, 56, 72 and 74 stand rejected under 35 USC §103(a) as being unpatentable over Johnson et. al. (US 6,439,731) in view of Shimada et. al. (US 6,010,867).

This rejection is moot in light of the cancellation and/or amendment of the dependency of these claims. Applicant neither admits nor denies the allegations set forth in the rejection and reserves the right to file a continuation application to the subject matter of the cancelled claims.

Johnson et. al. in view of Abileah et. al.

Claim 57 stands rejected under 35 USC §103(a) as being unpatentable over Johnson et. al. (US 6,439,731) in view of Abileah et. al. (US 7,280,102).

This rejection is moot in light of the amendment of the dependency of this claim to independent claim 58. Applicant neither admits nor denies the allegations set forth in the rejection and reserves the right to file a continuation application to the subject matter of the cancelled claims.

Johnson et. al. in view of Garwin et. al.

Claims 58-63, 75-78, 80 and 81 stand rejected under 35 USC §103(a) as being unpatentable over Johnson et. al. (US 6,439,731) in view of Garwin et. al. (US 5,949,402). Johnson et. al.

are said disclose an LCD or organic display having a uniform, high intensity backlighting, wherein said backlighting is provided by an illumination apparatus comprising:

- a first panel 10 comprising a grid of high intensity light point sources 12 (LEDs);
- a diffuser panel 20, the light passing directly from the point sources 12 to the diffuser panel 20; and
- a display panel 18, wherein each panel defines a plane overlaying and parallel to one another in sequence.

Johnson et. al. are said to disclose that the diffuser panel 20 converts light from the light point source into a more uniform glow across the surface of the LCD panel 18 so as to obtain a more uniform illumination of the LCD panel over a relatively wide range of viewing angle. However, Johnson et. al. are acknowledged as failing to disclose a second panel comprising Fresnel lenses wherein the first panel, the second panel and the diffuser panel each define parallel, overlaying, sequential planes.

Figure 4 of Garwin et. al. is said to disclose an optical pointing device comprising a first panel 23 comprising LED light sources 21, a second panel 20 comprising a panel of Fresnel lenses, and a diffuser panel 26, the light passing directly from the point light source 21 to the Fresnel lens 20, and, subsequently, to the diffuser panel, each panel parallel to and overlaying the other.

According to the Patent Office, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the illumination apparatus of Johnson et. al. with the teaching of Garwin et. al. by having a second panel comprising Fresnel lenses, wherein the first panel, the second panel and the diffuser panel overlay each other in sequence in order to improve the optical alignment and optical beam profiles of the LEDs: thereby improving the accuracy of the apparatus and obtaining a satisfactory performance without costly LED selection.

Re: claims 59 and 76, Johnson et. al. are said to disclose that the high intensity light point sources are LEDs (Col. 5, lines 1-9).

Re: claim 60, Johnson et. al. are said to disclose that the LEDs are aligned in a plurality of columns and rows as shown in Fig. 2.

Re: claims 61 and 77, Johnson et. al. are said to disclose that the first panel 10 comprises a grid of high intensity light sources 12 and a reflective background (col. 4, line 58 through col. 5, line 19).

Re: claim 63, Johnson et. al. are said to disclose that the first panel 10 comprises a grid of LEDs 12 and a reflective background (col. 4, line 58 through col. 5, line 19).

Re: claim 78, Johnson et. al. are said to disclose that the first panel 10 has a white background (Col. 4, lines 60-67).

Re: claim 80, Johnson et. al. are said to disclose that the display panel 18 is an LCD display panel.

Re: claim 81, Garvin et. al. is said to disclose that the illuminating apparatus is used for television (Col. 1, lines 5-8). It is further alleged that with the modification, it is obvious that the display panel can be a television.

Applicant respectfully traverses the rejection and requests reconsideration.

It is well established in Patent Law that a case of *prima facie* obviousness requires some impetus, whether a teaching, suggestion, motivation or another factor, to make the proposed change to the state of the art to arrive at the claimed invention **and** an expectation of success as to the outcome. Such is not present in the rejection as set forth by the Examiner.

Johnson et. al. teach a backlighting apparatus for an LCD display wherein the apparatus comprises a PCB circuit board having electronic circuitry on one side and an array of a plurality of LEDs on the other in combination with an optical diffusion panel overlaying the LEDs, intermediate the PCB and the LCD display panel. According to Johnson et. al., this configuration overcomes the cost and difficulty associated with the use of incandescent, florescent and conventional LEDs already in use for such applications and addresses the asserted long-felt need for practical low cost, thin and low profile, backlit, large display LCD devices having long life, a high degree of illumination uniformity and simple brightness adjustment circuitry.

The key to the successful use of the LEDs in Johnson et. al. is two-fold. First, the LEDs must be spaced sufficiently close to one another to generate light that is sufficiently bright and uniform to illuminate the display essentially uniformly at appropriate light levels (Col. 6,

lines 53-58). Secondly, one must employ a simple, low cost brightness adjusting circuitry on the opposite side of the PCB for adjusting the brightness or intensity of the LED light. Although this configuration is said to provide a “superior display uniformity,” Johnson et. al. also teach the use of a diffuser panel to further ensure uniformity. However, as acknowledged by the Examiner, Johnson et. al. make no mention of a Fresnel lens, let alone a panel of Fresnel lenses.

Garwin et. al. is said to provide the motivation or impetus for adding a Fresnel lens to the apparatus of Johnson et. al. As noted above, Figure 4 of Garwin et. al. is said to disclose an optical pointing device comprising a first panel 23 comprising LED light sources 21, a second panel 20 comprising a panel of Fresnel lenses, and a diffuser panel 26, the light passing directly from the point light source 21 to the Fresnel lens 20, and, subsequently, to the diffuser panel, each panel parallel to and overlaying the other. However, this characterization is at odds with and a clear misinterpretation of Garwin et. al.

Contrary to the characterization set forth above, Garwin et. al. actually teach a method of making a pointing device wherein the light of a select number of LEDs in a precise alignment and orientation is focused and aligned by use of a conventional lens 20, not a Fresnel lens, let alone a plurality of Fresnel lenses, to form a higher intensity, focused beam of light. Although this configuration is said to provide a superior performance, due to a concern that the conventional lens may too narrowly focus the light of the LEDs, Garwin et. al. also allow for the use of a single Fresnel lens, either before 56 or after 58 the diffuser panel 57, in addition to, but after, the conventional lens, to broaden the beam of light coming from the conventional lens (See Fig. 12 and col. 7, lines 43-55). However, Garwin et. al. warn us that this correction is not without consequence. Specifically, Garwin et. al. state: “An undesirable side-effect [of the Fresnel lens] is to re-introduce some dependence on the LED properties, as the LED alignment and beam profiles will affect the radial distribution of light. Therefore, only a small correction should be made” (Col. 7, lines 51-55).

Applicant claims a backlighting apparatus comprising an LED panel having a plurality of LEDs, a Fresnel lens panel having a plurality of Fresnel lenses, and a diffuser panel, in that order. Without being bound by theory, it is believed that the Fresnel lenses capture the light of the LEDs, lamps which, as admitted by Garwin et. al., are known to have poor optical precision and hence variable angular emission profiles (See Col. 1, lines 49-53), and refract

the light so as to align it generally perpendicular to the diffuser panel, thereby optimizing and enhancing the light and light intensity in the direction of the LCD display panel. The diffuser, then smoothes out and adds better uniformity to the overall light coming from the Fresnel lenses, which, in turn, provides a more uniform, higher intensity backlighting than if the Fresnel lenses were not present.

In contrast, while Johnson et. al. also mention the need for uniformity and intensity, they rely solely upon their “simple and inexpensive circuitry” which provides them with the ability to control the intensity of the backlighting illumination. They speak of this construction as providing superior illumination. Thus, there is nothing to suggest a need or desire to look elsewhere to further increase illumination intensity. Applicant, on the other hand has found that the use of a panel comprising a plurality of Fresnel lenses can be used to successfully further increase the intensity of the backlighting without adverse consequence.

In this regard, as noted above, the Examiner asserts that it would be obvious and one would be motivated to incorporate the Fresnel lens of Garwin et. al. in the backlighting apparatus of Johnson et. al. “in order to improve the optical alignment and optical beam profiles of the LEDs, thereby improving the accuracy of the apparatus and obtaining satisfactory performance without costly LED selection.” (Office Action, page 7, last paragraph to top of page 8) It is further asserted that “it is obvious that the structure comprising the first panel, the second panel and the diffuser panel, which is substantially identical to the claimed invention, provides a uniform high intensity backlighting to the display panel due to the accuracy of the illumination apparatus.” However, such conclusions and reasoning are faulty.

As just discussed, there is no reason or impetus in Johnson et. al. to add one Fresnel lens, let alone a plurality of Fresnel lenses, to their apparatus. Johnson et. al assert that they have attained superior, and essentially optimal, performance. Furthermore, and more importantly, the teaching of Garwin et. al. cautions against such a combination. Specifically, as quoted above, Garwin et. al. state: “An undesirable side-effect [of the Fresnel lens] is to re-introduce some dependence on the LED properties, as the LED alignment and beam profiles will affect the radial distribution of light. Therefore, only a small correction should be made” (Col. 7, lines 51-55). In this regard, it is also to be noted that Garwin et. al. teach of the option of

employing a single Fresnel lens, either before or after the diffuser panel; whereas, Applicant makes clear that a panel of a plurality of Fresnel lenses before the diffuser panel is critical.

Furthermore, while Applicant takes advantage of the light intensification properties of the Fresnel lenses, it is well known and affirmed by Garwin et. al. that a Fresnel lens concentrates the light captured by the Fresnel lens into a distinct, high intensity beam of light. Yet, we already know from Pelka (US 6,007,209), cited in the prior Office Action, that distinct sources of high intensity light are undesirable and disadvantageous for backlighting applications as they create “hot spots” and, thus, a lack of uniform backlighting. We also know from Pelka that that addition of a diffuser panel does not overcome this problem as they too employ a diffuser panel 20 (See Fig. 3 and Col. 3, lines 27-47). Rather, Pelka found that the only means to address and overcome the manifestation of “hot spots” was through the use of shields placed over the LEDs. Thus, the expectation from Garwin et. al. and Pelka, as well as the state of the art knowledge of Fresnel lenses in general, would be that one would only create more intense “hot spots” by employing a Fresnel lens in combination with a panel of unshielded LEDs. Consequently, knowing the issues with hot spots and the desirability of light uniformity, and knowing that one can control uniformity and intensity by simple and inexpensive circuitry, one would have no inclination to even try the combination claimed by Applicant, let alone expect success.

Thus, the Examiner has failed to establish prima facie obviousness of independent claims 58 and 75 and the rejection should be withdrawn and the claims passed on to allowance.

As to those claims dependent upon these independent claims, it is also well established that a claim dependent upon an allowable claim must also be allowable. Hence, the rejections of the dependent claims should also be withdrawn and those claims passed on to allowance as well.

Notwithstanding the foregoing, Applicant also wishes to specifically address the rejection of claim 81 wherein the Examiner asserts that Garwin et. al. disclose that the illuminating apparatus is used for television.. While it is accurate that the illuminating apparatus is used **with** a television, it is not part of the television. Rather, the illuminating apparatus comprises the light beam of a remote control device for operating the television: i.e., the high intensity beam produced by the apparatus is pointed to the receptor on the television for transmitting

control signals to the television. This is distinct from and has nothing to do whatsoever with backlight illumination of the display panel of a television (see Col. 1, lines 41-49).

As set forth above, unexpectedly, Applicant has found that by combining a panel comprising a grid of LES, a panel comprising a plurality, preferably an array, of Fresnel lenses, and a diffuser panel, one is able to provide high intensity, uniform backlighting. Thus, prima facie obviousness has not been established as Applicant has constructed an apparatus using elements that one skilled in the art would have thought inappropriate for the application and, unexpectedly, found that this construction provides superior intensity and uniformity as compared to similar apparatus, like Johnson et. al., at the same LED light intensity that do not possess the Fresnel lenses. Accordingly, the rejections should be withdrawn and the claims passed on to allowance.

Johnson et. al. in view of Garwin et. al. and further in view of Shimada et. al.

Claims 64-67 and 79 stand rejected under 35 USC §103(a) as being unpatentable over Johnson et. al. (US 6,439,731) in view of Garwin et. al. (US 5,949,402) as applied to claims 58-63, 75-78, 80 and 81 above, and further in view of Shimada et. al. (US 6,020,867).

Re claims 64, 65 and 79, it is acknowledged that Johnson et. al. in view of Garwin et. al. does not disclose that the diffuser panel is made of polycarbonate or glass. However, Shimada et. al. is said to disclose that a diffuser panel disposed in front of a backlighting apparatus may be formed of a transparent member such as polycarbonate or glass in order to provide a large area planar distribution showing a high luminance and a good viewing angle. Accordingly, it is asserted that it would have been obvious to one of ordinary skill in the art to modify the illumination apparatus of Johnson et. al. by employing a glass or polycarbonate diffuser in order to realize high luminance and good viewing angle characteristic.

Re claims 66 and 67, it is asserted that Shimada et. al. disclose the use of a front plate to protect the LCD panel wherein the protective panel is comprised of reinforced glass.

Applicant respectfully traverses the rejections.

As noted in the preceding section, claims dependent upon an allowable claim must likewise be allowable. Claims 64-67 and 79 are all dependent upon independent claims 58 and 75,

respectively, and, hence are likewise allowable. Accordingly, the rejections should be withdrawn and the claims passed on to allowance.

CLAIMS FEES

No additional claims fees are due as Applicant has previously paid for 4 independent claims and a total of 38 claims. As a result of the foregoing amendment, the application now contains 2 independent claims and a total of 37 claims.

SUMMARY

Applicant has focused the claimed subject matter on that construction wherein the backlight illumination apparatus comprises the combination of a panel of LEDs, a panel of Fresnel lenses and a diffuser panel, each overlaying, in parallel relationship, the other and in the stated sequence. Applicant has found that this construction provides high illumination and uniformity, without the expected "hot spots" as foretold by the cited art. Accordingly, the Examiner has failed to present a case of prima facie obviousness or, in the alternative, prima facie obviousness has been fully rebutted in light of Applicant's unexpected findings. Thus, all claims present patentable subject matter and are allowable. Early and favorable reconsideration is respectfully requested.

It is believed that this response is fully responsive to the Office Action of September 22, 2010. Should Applicant's belief be in error or should the Examiner have any questions or desire to discuss this application in general or this response in particular, the Examiner is kindly requested to contact the undersigned.

Respectfully Submitted

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